Advanced Multi-Product Coal Utilization By-Product Processing Plant

Participant
University of Kentucky Research Foundation

Additional Team Members
LG&E Energy Corporation—collaborator

University of Kentucky Center for Applied Energy Research (CAER)—collaborator

Location
Ghent, Carroll County, Kentucky (Kentucky Utilities Company's Ghent Power Station)

Technology
University of Kentucky CAER's hydraulic classification froth flotation process

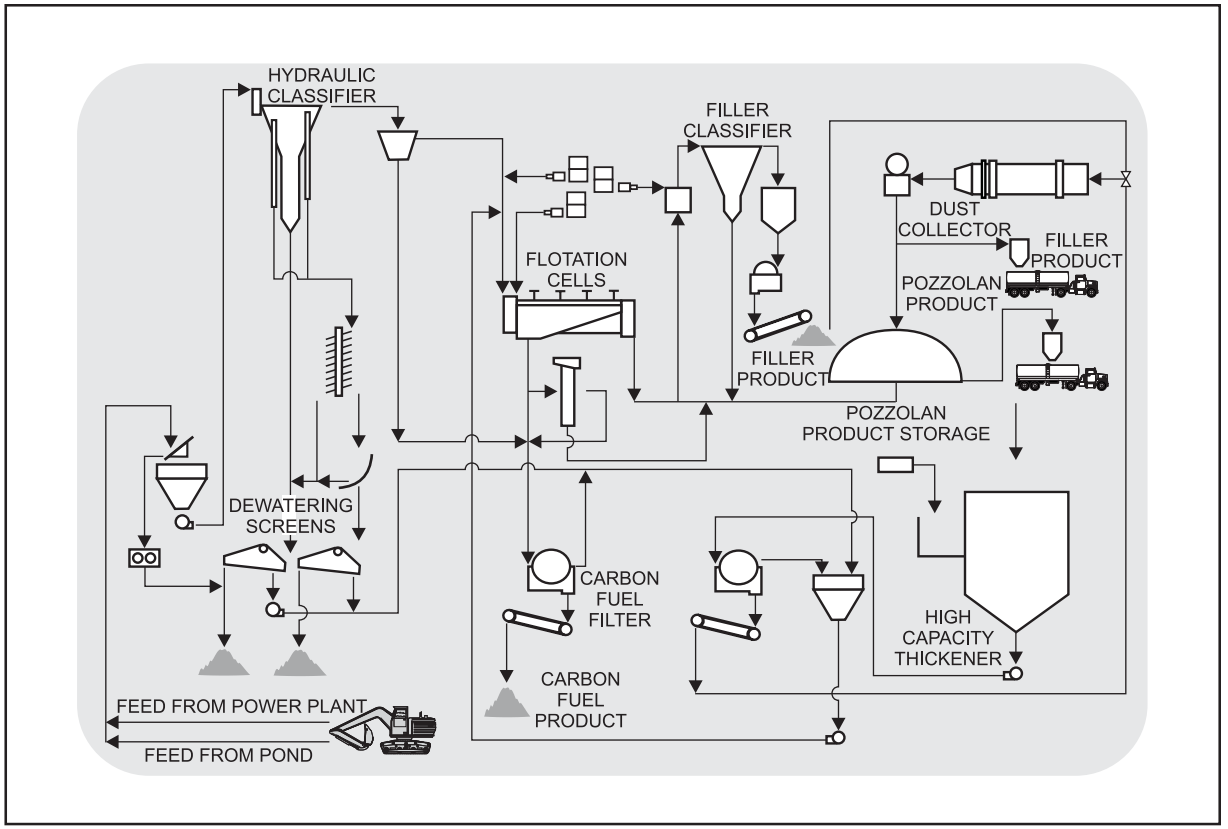
Project Capacity/Production
800 tons per day of coal ash input

Coal
Pittsburgh coal

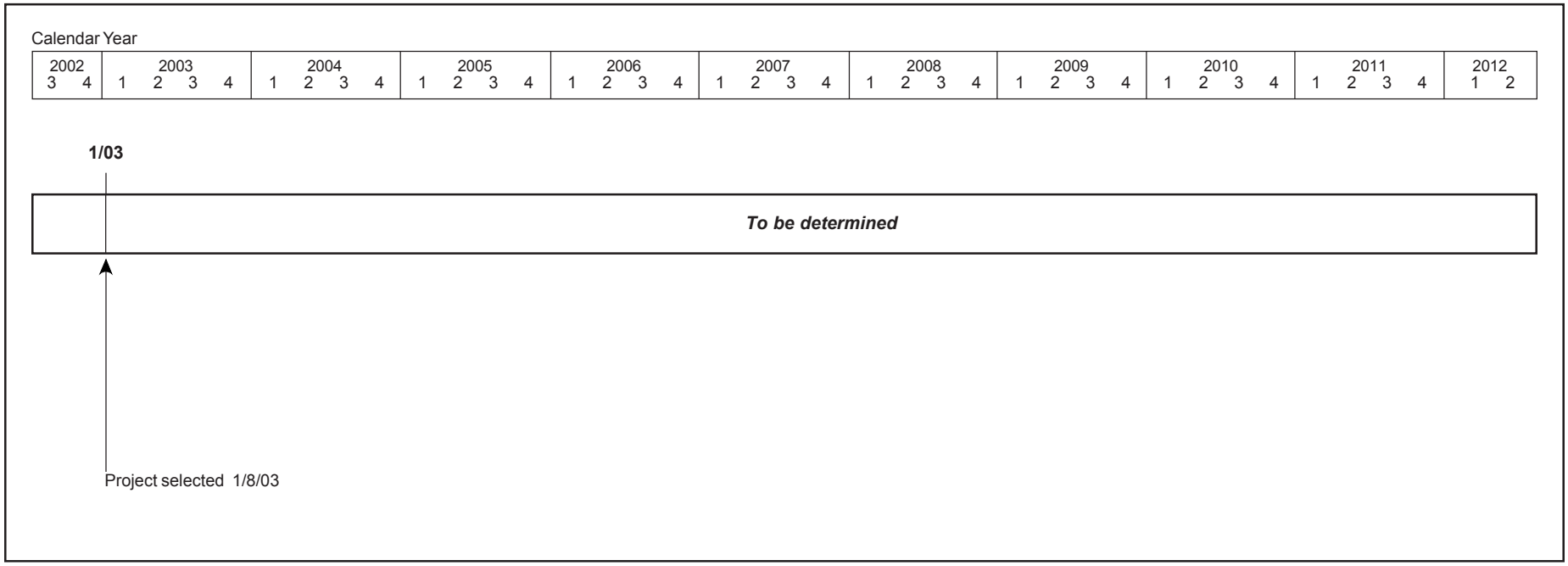
Project Funding

Total	$8,916,739	100%
DOE Share	$4,450,163	50
Participant	$4,466,576	50

Project Objective
To demonstrate an advanced coal ash beneficiation processing plant at the 2,200-MW Ghent Power Plant that will produce (1) pozzolan (cementitious material), high-grade, lightweight aggregate; (2) graded fill sand; (3) high-quality polymeric filler; and (4) recycled carbon fuel.



Technology/Project Description
The process is based upon a hydraulic classification and froth flotation technology developed at the University of Kentucky CAER. The technology can process ash stored in disposal ponds or directly from the plant. Raw feed is classified into a pozzolan stream (-200 mesh) and a coarse stream (+200 mesh). The coarse materials are further classified and concentrated into a sand product and coarse carbon product by spiral concentrators. The fine pozzolan stream is treated with a reagent system, the fine carbon removed via froth flotation, and the pozzolan concentrated, filtered, and dried. A small stream from the froth cell is further processed hydraulically to produce a fine particle suitable for use in a number of applications, including a polymer additive.



Project Status/Accomplishments

The project was selected for award on January 8, 2003. Negotiations are currently underway. The cooperative agreement is expected to be awarded by late-2003. The estimated project duration is about four years.

Commercial Applications

Throughout the United States, many coal-fired power plants utilize ash-settling ponds and in many cases are required to pay for offsite landfill disposal. This project addresses the use of all of the coal utilization by-products from the plant to produce salable and valued products. Finding a beneficial use of these materials will reduce the need for the creation of new ash settling ponds and extend the life of existing ponds.

One of the important benefits associated with this project is that the 156,000 tons per year of high-quality pozzolan, to be produced from coal by-products, will displace an equivalent amount of portland cement. Manufacturing portland cement results in release of approximately 1 ton of CO_2 per ton of cement produced. As such, this project represents a potential greenhouse gas offset. Cement making currently releases about 47 million tons per year of CO_2 in the U.S., making it one of the highest generators of CO_2 of any industrial process. Therefore, utilization of existing coal ash for this purpose offers a new pathway for reducing future CO_2 emissions related to the production of cement.